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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

July 3, 2002

Applicants: Suresh V. GARIMELLA et al.

For : THIN PROFILE PIEZOELECTRIC JET DEVICE

Serial No.: 09/863 831

Group: 2834

Filed : May 23, 2001

Examiner: Medley

Confirmation No. 8979

Assistant Commissioner for Patents

Washington, D.C. 20231

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RESPONSE TO OFFICE ACTION

Dear Sir:

Please amend the above application as follows:

IN THE CLAIMS

✓Cancel claims 9 and 18 without prejudice.

Substitute claims 1, 11, and 14 as follows for pending claims of like number:

a! 1. (Amended) A device for generating air flow, comprising a housing having an aperture with an axis that defines an air flow direction, a piezoelectrically actuated air-moving member disposed in said housing to move in a direction toward and away from said aperture, said air-moving member having a piezoelectric element, and a source of periodic signals for supply to said piezoelectric element with said signals having a frequency to resonantly move said air-moving member in said housing to produce periodic jets of air flow discharged from said housing through said aperture.

a² 11. (Amended) A device for generating air flow, comprising a housing having a first aperture at an end and a second aperture at an opposite end, said first aperture and second aperture having substantially parallel axes defining air flow directions, a bimorph member comprising first and second piezoelectric elements of opposite polarity, said bimorph member being disposed in said housing substantially perpendicular to said axes for movement toward and away from said first aperture and second aperture, and a source of periodic signals to said elements with said signals having a frequency to resonantly move said bimorph member in said housing to produce periodic jets of air flow that are discharged from said housing through said first aperture and second aperture.

a³ 14. (Amended) A method of generating air flow, comprising electrically driving a piezoelectrically actuated air-moving member disposed in a housing to resonantly move in a direction toward and away from an aperture in the housing to produce periodic jets of air flow discharged from said housing through said aperture in said direction.

Version of claims 1, 11, and 14 showing changes made thereto follow:

1. (Amended) A device for generating [a jet of] air flow, comprising a housing having an aperture with an axis that defines an air flow direction, [and] a piezoelectrically actuated air-moving member disposed in said housing to move in a direction toward and away from said aperture [in a manner that periodic jets of air are discharged through said aperture in said direction], said air-moving member having a piezoelectric element, and a source of periodic signals for supply to said piezoelectric element with said signals having a frequency to resonantly move said air-moving member in said housing to produce periodic jets of air flow discharged from said housing through said aperture.

11. (Amended) A device for generating [one or more jets of] air flow, comprising a housing having a first aperture at an end and a second aperture at an opposite end, said first aperture and second aperture having substantially parallel axes defining air flow directions, a bimorph member comprising first and second piezoelectric elements of opposite polarity, said bimorph member being disposed in said housing substantially perpendicular to said axes for movement toward and away from said first aperture and second aperture, and a source of periodic signals to [actuate] said [bimorph disc in a manner that] elements with said signals having a frequency to resonantly move said bimorph member in said housing to produce periodic jets of air flow that are discharged from said housing through said first aperture and second aperture.

14. (Amended) A method of generating [a jet of] air flow, comprising [moving] electrically driving a piezoelectrically actuated air-moving member disposed in a housing to [bend] resonantly move in a direction toward and away from an aperture in the housing to produce periodic jets of air flow discharged from said housing through said aperture in said direction.

REMARKS

This response is offered in reply to the office action of March 6, 2002. A petition and fee for a one month time extension are enclosed.

In paragraph 2 of the office action, claims 1-5, 7-9, and 14-18 are rejected under 35 USC 102(b) in view of the Toki patent.

This rejection is believed to be in error. In particular, claims 1-5 and 7-9 relate to a device for generating air flow, while claims 14-18 relate to a method for generating air flow. In contrast, the Toki patent involves an acoustic transducer/speaker that generates sound waves. As sound waves propagate through a medium, within the domain of linear acoustics, they cause fluid particles merely to oscillate about a mean position, and they fail to generate fluid flow such as Applicants' jets of air flow.

Applicants claim 1 recites, in combination with other features set forth, a piezoelectrically actuated air-moving member disposed in a housing to move in a direction toward and away from an aperture and having a piezoelectric element, and a source of periodic signals for supply to the piezoelectric element with the signals having a frequency to resonantly move the air-moving member in the housing to produce periodic jets of air flow discharged from the housing through the aperture in the direction.

The Toki patent fails to disclose these features set forth in Applicants' claim 1.

Claim 14 recites electrically driving a piezoelectrically actuated air-moving member disposed in a housing to resonantly move in a direction toward and away from an aperture in the housing to produce periodic jets of air discharged from the housing through the aperture in the direction.

Again, the Toki patent fails to disclose these features set forth in Applicants' claim 14.

The Toki patent likewise fails to disclose features of depending claims 4-5, 7-9, and 15-18. For example, the Toki patent fails to disclose apertures through which jets of air flow are discharged as set forth in claims 2, 10, and 19. As mentioned above, the Toki patent does not generate periodic jets of air flow by resonant

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movement of a piezoelectrically actuated air-moving member in a housing for discharge of the jets of air flow through apertures in the housing.

Reconsideration of the rejection of claims 1-5, 7-9, and 14-18 is requested.

In paragraph 3 of the office action, claims 6, 11, and 13 are rejected under 35 USC 102(b) in view of the Nakamura patent.

This rejection is believed to be in error. In particular, claim 11 relates to a device for generating air flow. In contrast, the Nakamura patent involves an acoustic speaker that generates sound waves. As mentioned above, as sound waves propagate through a medium, within the domain of linear acoustics, fluid particles merely oscillate about a mean position.

Applicants claim 11 recites, in combination with other features set forth, a bimorph member comprising first and second piezoelectric elements of opposite polarity with the bimorph member being disposed in a housing substantially perpendicular to axes for movement toward and away from a first aperture and second aperture, and a source of periodic signals to the piezoelectric elements with the signals having a frequency to resonantly move the bimorph member in said housing to produce periodic jets of air flow that are discharged from the housing through said first aperture and second aperture.

The Nakamura patent fails to disclose these features set forth in Applicants' claim 11 and also the features of depending claims 6 and 13.

Reconsideration of the rejection of claims 6, 11 and 13 is requested.

In paragraph 5 of the office action, claims 10 and 19 are rejected under 35 USC 103(a) in view of the Toki patent.

This rejection is believed to be in error. The examiner will now note that the Toki patent involves an acoustic transducer/speaker that generates sound waves. The examiner's taking of Official Notice regarding aperture dimensions for air flow thus missed the point that the Toki generates sound waves and not jets of air flow. The taking of Official Notice thus is incorrect.

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Reconsideration of the rejection of claims 10 and 19 is requested.

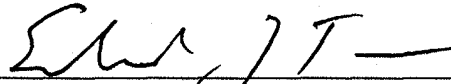
In paragraph 6 of the office action, claim 12 is rejected under 35 USC 103(a) in view of the Nakamura patent.

This rejection is believed to be in error. The examiner acknowledges that the Nakamura patent does not disclose a groove for receiving a bimorph member. The examiner's taking of Official Notice that a groove is a groove is correct; however, Applicants fail to see how the shelf 14b of the Nakamura patent can be said to be equivalent of Applicants' recited groove. The examiner appears to be using a prohibited hindsight analysis to reject claim 12.

Reconsideration of the rejection of claims 12 is requested.

Applicants request allowance of the pending claims.

Respectfully submitted,

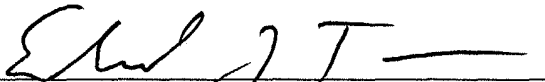


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CERTIFICATE OF MAILING

I hereby certify that this correspondence and enclosures are being deposited with the United States Postal Service as first class mail under 37 CFR 1.8 in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231, on July 3, 2002.



Edward J. Timmer